

REMARKS

Summary of Office Action and this Response

All the claims have been rejected under the judicially created Doctrine of Obviousness Type Double Patenting as being unpatentable over claims 1-48 of U.S. Patent No. 6,677,422 in view of Dankworth et al. (U.S. Patent No. 5,650,536) and E. Bruce Nauman ("Chemical Reactor Design, Optimization, and Scaleup", McGraw-Hill 2002). All of the claims have been rejected under 35 U.S.C. 103 over the three references mentioned above and additionally the Jarvis et al. patent (U.S. Patent No. 4,728,701) with regard to claims 23, 64 and 104. Finally, claims 122-124 have been rejected under 35 U.S.C. 102(e) or alternatively under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 6,677,422.

Reconsideration of the above rejections in view of this response is respectfully requested. The claims have been streamlined to put in issue claims 82-121. Claim 82 has been amended to correct a typographical error. Accordingly, the claims now under consideration read on a continuous process for making a copolymer composition containing residues of at least one isobutylene-type olefinic monomer. The olefinic monomer or a mixture of monomers and initiators are fed to a pressurized stirred tank reactor (STR). The monomer composition is maintained in the STR for a sufficient time to effect conversion of the monomers to polymer. The resulting polymer is discharged from the STR. The monomers and the initiator are introduced to the STR at essentially the same rate that the polymer is withdrawn and any unreacted monomers are removed from the polymer and are used as part of the monomer(s) that are fed into the STR. The key to the process is maintaining the liquid level in the STR such that there is no air or vapor space in the reactor.

In connection with the double patenting rejection, the claims of U.S. Patent No. 6,677,422 (Coca et al. patent) are compared with the claims of the present invention. Also, the skill of the art as considered by the secondary references must be taken into consideration.

Although the claims of the Coca et al. patent relate to a process for polymerizing olefinic monomers, such as the isobutylene-type monomers, and a STR is used for the polymerization, there is no disclosure or suggestion in the claims of the Coca et al. patent of a continuous process for making the polymer in which the polymer is withdrawn from the STR at essentially the same rate that the monomers and initiators are introduced and any unreacted monomers are removed from the polymer and used at least as part of one of the monomers being fed to

the reactor. Also, there is nothing in the secondary references to overcome this deficiency associated with the claims of the Coca et al. patent.

The Dankworth et al. patent (U.S. Patent No. 5,650,536) relates to a continuous process for functionalizing polymer in which the polymer is reacted with carbon monoxide and a so-called nucleophilic trapping agent in the presence of an acid catalyst. This results in the formation of the carboxylic acid or ester-containing polymer depending upon the choice of the nucleophilic trapping agent. There is no suggestion in Dankworth of a continuous process for preparing polymers in which a mixture of olefins is polymerized with one another. Rather, in Dankworth et al. the polymer itself is reacted with carbon monoxide. Also, contrary to the position expressed in the Official Action, there is no disclosure in Dankworth et al. of maintaining the liquid level in the STR such that there is substantially no air or vapor space in the reactor. The disclosure in Dankworth et al. that the STR is operated in a substantial absence of air and a constant liquid level is not an indication that there is substantially no air or vapor space in the reactor. In fact, the contrary appears so. Evidence of this can be seen in the working examples of Dankworth et al., specifically Examples A and B which clearly indicate the presence of a vapor space in the reactor. Since Dankworth et al. is reacting with carbon monoxide, carbon monoxide fills the vapor space of the reactor such that there is a substantial absence of air. Further, constant volume does not indicate that essentially 100% of the volume of the STR is occupied by the reactive liquid in the STR. As shown in Example B of Dankworth et al., only 60% of the volume is reactive liquid.

Also, the E. Bruce Nauman reference does not overcome the deficiencies associated with the above two references. This reference merely discloses the benefits of a series of continuous stirred reactors. Therefore, it is requested that the double patenting rejection associated with claims 82-121 be withdrawn.

With regard to the rejection of the claims under 35 U.S.C. 103 over the same combination of references mentioned above, the above arguments would appear to be equally applicable. There is no disclosure in the Coca et al. patent of a continuous process. Likewise, although the Dankworth et al. secondary reference discloses a continuous process, the process is associated with reacting carbon monoxide with a polymer rather than polymerizing a mixture of olefin monomers as required by applicants' claims. Therefore, even if Coca et al. was modified as suggested by Dankworth et al., applicants' claims would still not be met. Further, there is no disclosure in Coca et al. and Dankworth et al. of conducting a process in which the

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liquid level in the STR is such that there is substantially no air or vapor space in the reactor.

The Jarvis et al. reference has been cited as being pertinent to claims 23, 64 and 104 wherein a back pressure control valve is positioned on an outlet. However, there is no teaching in Jarvis et al. of conducting the polymerization in the manner now set forth in applicants' claims.

The rejection of claims 122-124 under 35 U.S.C. 102(e) or alternatively under 35 U.S.C. 103(a) over U.S. Patent No. 6,677,422 is now moot in view of the cancellation of these claims.

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CONCLUSION

Based on the above remarks, it is believed that applicants' claims as presently presented are patentable over the prior art of record and an early and favorable response to this amendment is respectfully requested. If the Examiner feels that there are any issues unresolved, she is urged to contact applicants' Pittsburgh attorney at 412-496-3430.

Respectfully submitted,



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